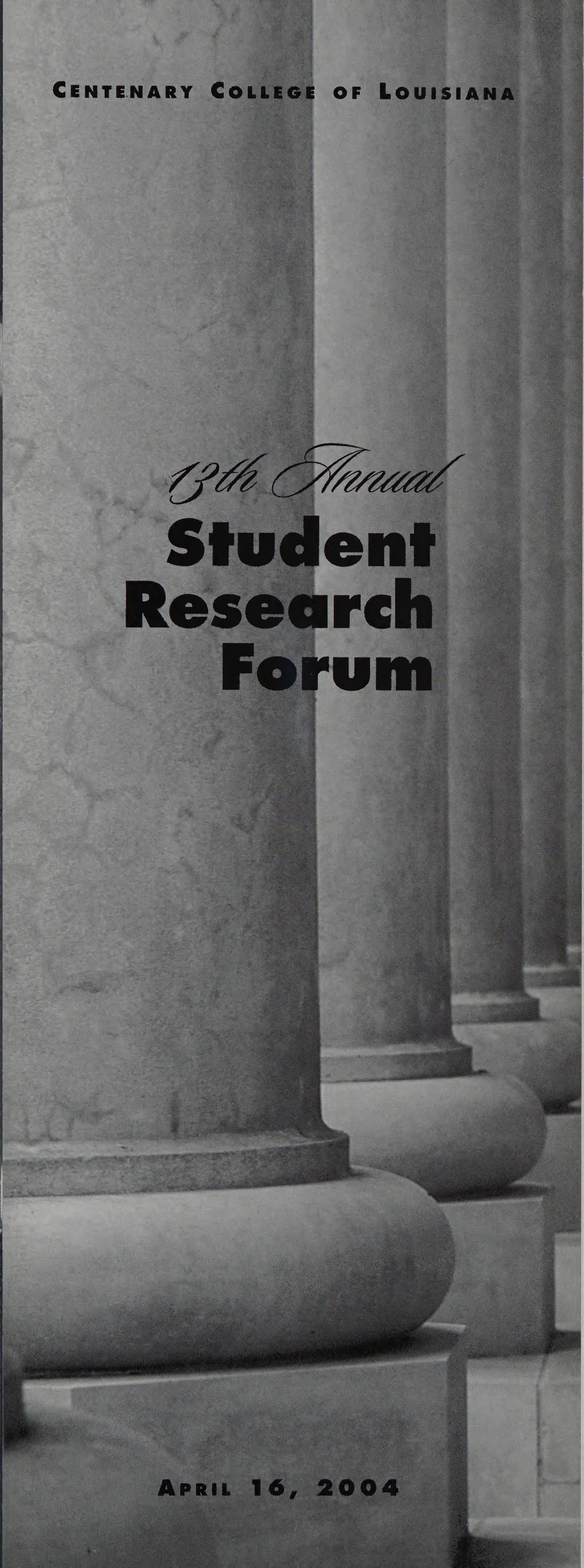
CENTENARY COLLEGE OF LOUISIANA

13th Annual

Student Research Forum



APRIL 16, 2004

CENTENARY COLLEGE OF LOUISIANA

13th Annual

Student Research Forum

April 16, 2004

Posters

Carlile Auditorium
(Mickle Hall 114)
12:30 – 1:30 PM

Humanities

Kilpatrick Auditorium
(Smith Building)
1:30 – 2:50 PM

Social Sciences

Kilpatrick Auditorium
(Smith Building)
3:10 – 4:30 PM

Natural Sciences

Carlile Auditorium
(Mickle Hall 114)
2 – 4:20 PM

13th Annual

Student Research Forum

Sponsored by

Centenary Book Bazaar and
Provost and Dean of the College

Judges

Dr. David Bieler
Dr. Scott Chirhart
Dr. Maureen Murov
Dr. Ross Smith
Dr. R. Matthew Weeks

From the Director

Thank you participants and advisers for doing the research projects and presenting your work in this forum. This 13th annual forum is one of the largest forums and hopefully it will be "the best" one.

Thank you judges, for your time and effort on this great event.

A special thanks is given to the Centenary Book Bazaar for its financial support. It is greatly appreciated!

A sincere thanks is also given to the Provost and Dean of the College, Dr. Darrel Colson, for all of his encouragement, financial support and selection of the judges.

Thank you Ms. Jeannie Clements, Office of the Provost, and Ms. Peggy Cooper, Office of Public Relations, for all your work on the brochure, room arrangements, refreshments, etc. You are the best!

Dr. Alfred McKinney, Director
13th Annual Student Research Forum

Research Posters

Posters (Judging)

MICKLE HALL 114

Devon Castleberry, Biology — 12:30 – 1:30 PM
Rosie Daniel, Psychology
Davon Ferrara, Physics
C. Sean Hauser, Biology
Mindi Levinski, Biology
Andrew Mai, Biology
Sarah Myers, Biology
Diya Surie, Physiology
Kathryn Thompson, Biochemistry

Oral Presentations

Humanities

KILPATRICK AUDITORIUM

Kristin Cochran, English/Gender Studies ..... 1:30 PM
Deborah Engle, Art and Visual Culture ..... 1:40 PM
Jennifer Hamblin, English ..... 1:50 PM
Kate Howell, Art and Visual Culture ..... 2:00 PM
Patrick McCuller, Art and Visual Culture ..... 2:10 PM
Katie McKay, Religious Studies ..... 2:20 PM
Lacey Nichols, Religious Studies ..... 2:30 PM
Jennifer Powell, Religious Studies ..... 2:40 PM

Break ..... 2:50-3:10 PM

Social Sciences

KILPATRICK AUDITORIUM

Lyndsay Bigler, Economics ..... 3:10 PM
Adam Dufour, Accounting ..... 3:20 PM
Elliott Grand, Economics ..... 3:30 PM
Alexander Lu, Sociology ..... 3:40 PM
Nathaniel Lucena, Psychology and Sociology ..... 3:50 PM
Stuart McMahen, Sociology ..... 4:00 PM
Jennifer Powers, Sociology ..... 4:10 PM
Esther Seitz, Economics ..... 4:20 PM
Joey Thompson, Political Science ..... 4:30 PM

Natural Sciences

CARLILE AUDITORIUM

Addie Dickson, Biology ..... 2:00 PM
Daniel Do, Chemistry ..... 2:10 PM
Davon Ferrara, Mathematics and Physics ..... 2:20 PM
Nina Fertitta, Chemistry ..... 2:30 PM
Ashley Lacy, Biochemistry ..... 2:40 PM
Lacy Millet, Neuroscience ..... 2:50 PM

Break ..... 3:00-3:20 pm

Laurie Stevison, Physics ..... 3:20 PM
Jeff Szot, Biology ..... 3:30 PM
Christina Taylor, Chemistry ..... 3:40 PM
Melissa Tharp, Health and Exercise Science ..... 3:50 PM
Jaymi Ward, Biology ..... 4:00 PM
Erin Watson, Biology ..... 4:10 PM

The Effects of an Impoverished Environment on Metabolic Rates of Crawfish in Relation to Temperature

Devon Castleberry

Research Advisor: Dr. Beth Leuck
Department of Biology
Centenary College of Louisiana

I hypothesized that crawfish in impoverished environments would show a higher metabolic rate than those in enriched environments and that multiple housing of crawfish versus individual housing adds to the enrichment of an environment. Carbon dioxide production measurements were used as indicators of metabolic rate. Groups of crawfish in the impoverished environment had the highest metabolic rates, while multiple crawfish in the enriched environments had the lowest metabolic rates. These results are exceptionally important to the crawfish industry because the variation in metabolic rate and therefore activities in crawfish due to environmental conditions would likely cause inaccurate results in experiments performed on crawfish in an impoverished condition, particularly those that depend on activity levels such as growth.

Self Awareness Study

Rosie Daniel

Research Advisor: Dr. Matthew Weeks
Department of Psychology
Centenary College of Louisiana

Previous research has produced conflicting results as to whether self-awareness enhances or inhibits performance. This study explores the relationship between self-awareness induced by mirror presence and performance on a math exercise, a 50-piece puzzle, and a personal attractiveness survey. The study also investigates whether mirror presence affects males and females differently. Results indicate the effects of mirror presence were moderated by personal attractiveness ratings. Specifically, participants who completed the math exercise in the presence of a mirror scored higher than participants who completed it without a mirror, however this was only true for those with a negative attractiveness rating. The presence of a mirror

did not affect the time required to complete the puzzle, but females completed the puzzle significantly faster than males. The presence of a mirror did not have an overall effect on participants' feelings towards their bodies, but results for individual items on the survey varied. Findings will be discussed regarding the effects of mirror presence of students' performance and ratings.

Method for Detecting Low Concentrations of Nitric Oxide Gas

DAVON FERRARA[1]*, MARTIN FEELISCH, PH.D.[2], JUAN RODRIGUEZ, PH.D.[1, 2]

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CENTENARY COLLEGE OF LOUISIANA

[2]DEPARTMENT OF MOLECULAR AND CELLULAR PHYSIOLOGY
LOUISIANA STATE UNIVERSITY HEALTH SCIENCES CENTER

The need to quantify nitric oxide (NO) related products generated in vivo and under basal conditions has led to the need for increased sensitivity in NO detection. Here we propose one such method to increase the signal to noise ratio significantly for methods based on gas phase detection of NO. The basic principle behind the apparatus is that a gas, which flows over a surface with a sufficiently low temperature, will condense out of the gas phase onto the surface. The technique involves condensing NO out of its carrier gas mixture for a certain period of time and then quickly reheating the NO so that it is released in a highly concentrated bolus as it travels through the detector. Our results show that the method can significantly increase the concentration of NO going through the detector during the bolus release of the condensate. The accuracy of the technique, including how it is affected by the pressure changes that occur inside the detector due to the sudden changes in temperatures, is also discussed.

Effects of Environmental Flow Rate on the Upper Critical Temperature of the Mosquitofish *Gambusia affinis*

C. Sean Hauser

Research Advisor: Dr. Beth Leuck
Department of Biology
Centenary College of Louisiana

This project was designed to determine the relationship between acclimation temperature and the upper critical temperature of the mosquitofish *Gambusia affinis* in environments with and without current. The mosquitofish is an environmentally important species because of its role as a pest controller, and critical temperature studies of this species can impact the range of its dispersal. It was hypothesized there would be an increase in the upper critical temperature in environments with current. The project was conducted by subjecting three groups of 11 fish to three acclimation temperatures for three days, after which the groups' upper critical temperatures were measured. An increase in the upper critical temperatures was observed in the samples subjected to a current when compared to the control group.

Enriched versus Impoverished Effects on Oxygen Consumption on Indigenous Dragonfly Larvae

Mindi Levinski

Research Advisor: Dr. Beth Leuck
Department of Biology
Centenary College of Louisiana

I examined the effects of impoverished versus enriched environments on the metabolic rate of dragonfly nymphs, aquatic sit-and-wait predators. I hypothesized that an increased metabolic rate would indicate an increased stress level and would be present among the dragonfly nymphs in the impoverished environment because they would not have the ability to hide from predators among leaf litter as they do in the wild. The nymphs in the enriched environment had a significantly higher rate of oxygen consumption than those in the impoverished environment. This increased oxygen consumption was most likely due to an increased activity level from stalking prey instead of an increased level of stress.

Effects of Enriched Environments versus Impoverished Environments on Alcohol Preference in Mice

ANDREW MAI

RESEARCH ADVISOR: DR. BETH LEUCK
DEPARTMENT OF BIOLOGY
CENTENARY COLLEGE OF LOUISIANA

Current methods and conditions of laboratory research have recently been questioned by several studies that point out that research animals housed in impoverished conditions could have impaired physiological and psychological health, thus altering data of important experiments. In the past, alcohol consumption has been used at a factor that directly measures the amount of stress of the subject. I compared the alcohol consumption between animals living in enriched and impoverished environments to gain insight on the differences in stress. I also recorded so called "stereotypic" behavior. The EtOH Impoverished mice showed a significant increase in alcohol consumption (R^2=0.49, $p<0.5$) within an 11 day period whereas the EtOH enriched mice showed little change in alcohol consumption (R^2=0.12, $p<0.5$). Occurrences in stereotypic behavior were almost exclusively observed in impoverished mice in this experiment. One such behavior was gnawing on the steel bars, the frequency of this behavior was observed 190 times in impoverished mice and zero times in enriched mice. The results of my study show that current housing conditions for laboratory mice are poor and should be improved if we expect to get accurate data from biomedical research.

Effects of Caffeine and Environmental Stress on Oxygen Consumption and Behavior of Laboratory Mice *(Mus musculus)*

SARAH MYERS

RESEARCH ADVISOR: DR. BETH LEUCK
DEPARTMENT OF BIOLOGY
CENTENARY COLLEGE OF LOUISIANA

Stereotypic behavior, an abnormal behavior related to unnecessary confinement, is common among laboratory mice housed in impoverished conditions. I compared the oxygen consumption of mice under the effects of caffeine or no caffeine in both enriched and impoverished environ-

ments. Although there were no significant differences in oxygen consumption among mice in different environments, the mice given caffeine in an impoverished environment had the higher levels of oxygen consumption. I also tested the mice in the Morris Water Maze for learning ability. The mice in an enriched environment without caffeine were the only group to show a continuous drop in latency in the Morris Water Maze.

Troglitazone Inhibits Breast Cancer: Mechanism

DIYA SURIE(*)[1,3], ROBERT OLIVER[1], ELLEN FRIDAY[2], AND TOMAS WELBOURNE[1]

RESEARCH ADVISOR: TOMAS WELBOURNE

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LOUISIANA STATE UNIVERSITY HEALTH SCIENCES CENTER
AND [3]CENTENARY COLLEGE OF LOUISIANA

RESEARCH CONDUCTED AT
DEPARTMENT OF MOLECULAR AND CELLULAR PHYSIOLOGY
LOUISIANA STATE UNIVERSITY HEALTH SCIENCES CENTER

Troglitazone (TRO) exhibits anti-tumorigenic properties based on actions mediated by PPARϒ and PPARϒ independent pathways. The PPARϒ independent pathway(s) may involve a TRO-induced spontaneous cellular acidosis. My goals are to: (1) Show that TRO does indeed induce spontaneous acidosis, (2) confirm that the acidosis produced is not due to an artifact (3) show that the spontaneous acidosis produced was not caused by an increase in lactic acid, (4) show that the acidosis was caused by an inhibition of the sodium-hydrogen exchanger (NHE), (5) suggest that TRO did not inhibit the exchanger by binding to the sodium site on NHE and (6) to propose that the inhibition therefore occurred at a phosphorylation regulatory site on NHE. To achieve these goals I used breast cancer derived MCF-7 cells and the BCECF spectrofluorimetric method to measure intracellular pH. The results that follow will confirm these goals and also demonstrate that the marked acidosis inhibited DNA synthesis.

Structural Analysis of the Zn^{2+}-finger Domain of Active Zone Protein Rim2α

KATHRYN THOMPSON

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UT SOUTHWESTERN MEDICAL CENTER

The chemicals that conduct action potentials across the synapse between two neurons are called neurotransmitters. Small synaptic vesicles store these molecules until the action potential arrives, signaling the vesicle membrane to fuse to the presynaptic plasma membrane. Fusion releases the neurotransmitters into the synaptic cleft.

Before membrane fusion occurs, a four-helix bundle called the SNARE or core complex forms, bringing the membranes together. In neurons, a SNARE protein called Syntaxin1 must be in open conformation for the core complex to form. Another protein, Munc18, forms a complex with the closed conformation of Syntaxin1. Munc18's function is unknown, but it is absolutely crucial for neurotransmission. How can it be both executive and inhibitory?

It is thought that the concerted action of two active zone proteins, Rim and Munc13, releases Syntaxin1 from Munc18, allowing them to perform their executive functions. Rim and Munc13 interact functionally, presumably through direct binding of Rim's N-terminal Zn^{2+}-finger domain and Munc13's N-terminal region.

As part of ongoing efforts to characterize the interaction of Rim and Munc13, multi-dimensional nuclear magnetic resonance (NMR) experiments were performed on the Rim domain and sequential assignments were made. Then NMR binding experiments were performed with Rim and Munc13.

The Declaration of Sentiments and its Influence on the Development of Feminism in the Nineteenth-Century

KRISTIN COCHRAN

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ENGLISH/GENDER STUDIES
CENTENARY COLLEGE OF LOUISIANA

The 1848 Seneca Falls Convention is known for its collective push for women's enfranchisement. However, the *Declaration of Sentiments and the Resolutions adopted by the Women's Rights Convention* not only reflects many of the issues prominent in the early stages of the women's rights movement, when discourse was largely limited to the domestic sphere, but actually shifts the focus from domestic roles to political action.

Using literary texts like Fern's *Ruth Hall* and Alcott's *Work*, and social criticism from Wollstonecraft, Catharine Beecher, Fuller, Anthony, and Stanton, I examine how the progression of the women's rights movement was a driving force for key issues such as the redefinition of the home and marriage, economic independence, education, and women's public involvement. I argue that the 1848 Convention initiated women's transition into the public sphere, and allowed them to become agents of social change through their political action. Toward the end of the century, women took this political action further as they began to realize that enfranchisement was only the first step, and that as they gained equal access to education, labor, and individuality that they would need to become not only involved in the public sphere, but equal partners in its formation.

Single Motherhood: How Do We Do It?

DEBORAH BUCHANAN ENGLE

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DEPARTMENT OF ART AND VISUAL CULTURE
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This paper references several representations of single parents, specifically mothers, which are offensive, prejudicial and/or exclusionary. This negative visual culture has

helped dictate the attitudes toward and perceptions about single mothers throughout the mid- to late-twentieth century. The American phallocentric concept of motherhood and femininity, coupled with repetitive, negative stereotyping of women who parent alone, do little to empower single mothers. In many cases, these misrepresentations almost mock the sanctity and honor of motherhood as a whole.

Based on decades of research, therapists have discovered that traditional nuclear families offer no guarantee that children will grow up more successful or more well rounded than children of single-parent households. Unfortunately, mass media representations of single mothers provide a very biased look into the lives of single mothers, thereby perpetuating a stereotype of poverty-stricken, weak willed, and inferior women. Examples such as the misuse of Dorothea Lange's *Migrant Mother* photograph, films including *Jerry McGuire* and *As Good As It Gets*, parenting magazines and television shows are cited as proof that, in a culture with a 51% divorce rate, mothers who happen to be unmarried must struggle against overwhelming media messages for respect, validation, and realistic recognition.

The Affect of Point of View on Reader Connectability

JENNIFER HAMBLIN

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DEPARTMENT OF ENGLISH
CENTENARY COLLEGE OF LOUISIANA

This project focuses on how a writer's use of point of view can dramatically change the reader's opinion of the characters. I will be comparing how each point of view has benefits and faults, and point of view can help a writer to portray the information he or she needs depending on the type of characters and story. I will use examples of modern texts to explain all of my finding and use my own sample writing to show the effectiveness of the use of point of view as a connectability technique.

Lesbian Pulp Fiction Cover Art and the Defining of the American Lesbian

KATE HOWELL

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Pulp fiction chronicles the moral climate of America. The cover art of pulps dealing primarily with lesbianism offers valuable insight into how lesbianism was viewed in the America of the 1950s-60s. The term "lesbian" was engineered in the early 20th century to define female homosexuality as pathological, closely related to feminism and women's education, and dangerously contagious. When analyzing the compositions of pulp covers in conjunction with contemporary writings by sexologists and psychologists, we see that a similar sexist heterosexual paradigm was employed to sell scientific books as well as pulp fiction. Ironically, the rather "trashy" and somewhat subversive genre of lesbian pulp maintained modern American gender-based politics of societal categorization, circulating negative stereotypes about lesbians. Lesbians were almost always portrayed as either mentally unstable or unsound, murderous, predatory and sex-crazed, or simply young, aggressive and arrogantly sluttish, even to lesbian readers, regulating, if not prohibiting, lesbian self-definition. Because it was the most widely circulated American representation of homosexual women, pulp cover art continues to influence contemporary images of lesbianism and homosexual women, which repeats and normalizes the same myths and misconceptions.

Cultural and Social Analysis through Art

PATRICK MCCULLER

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DEPARTMENT OF ART AND VISUAL CULTURE
CENTENARY COLLEGE OF LOUISIANA

A presentation of how cultures and societies use art to portray guidelines they use to form individuals and groups. This research was done by taking pieces from a student art show and elaborating the results of how religion and society have institutionalized us.

Toward a Theology of Blessing: A Comparative Study of Creation Spiritualist Theology Through the Writings of Dr. Martin Luther King Jr. and Matthew Fox

KATIE MCKAY

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Creation spirituality – a religious methodology of praxis and theory through art as meditation, the revision of our mystical heritage, an analysis of our cultural situation, the appropriation of scientific perspectives, and ways of reimaging our relationship to the Divine – has remained detached from religious practice in Western culture in recent centuries. This doctrine, because of its "new age" classification in contemporary theological study, is deprived of its potential to provide a prophetic voice to the Church of the 21st century and a legitimate association to theologians that have had any formidable influence on Christian theology.

Dr. Martin Luther King Jr., through his creation of the ideal of Beloved Community, economic justice, and nonviolence, exhibits some evidence of creation spiritualist ideas within his rhetoric, yet he has not been identified as a creation spiritualist within academic scholarship.

In this research paper, by using the theology of *Original Blessing*, created by Matthew Fox, as a comparative standard, I will demonstrate that through an analysis of his theology, sermons, and writings, Martin Luther King, Jr. was a creation spiritualist.

Making the Old New Again: Resexualization of Reform Jewish Women Through a New Understanding of the Mikvah Ritual

LACEY NICHOLS

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For the last 20 years, several Reform Jewish feminist scholars (Steinberg, 1997; Peskowitz and Levitt, 1997; Waskow, 1998) have attempted to provide new context and meaning for *mikvah*, a purification ritual traditionally

used by woman at the end of their menstruation to rejuvenate her and once again become a potential partner with G-d and her husband in the act of creation. Much of the recent work focuses on using the mikvah ritual to focus on issues of selfhood rather than purification. It seems, however, that most feminist scholars have bypassed the critical issue of sexuality as a critical dimension of selfhood. As Jewish women struggle under patriarchal societies, which tend to objectify women's bodies and sexuality, it would seem critical that any modern recontextualization of mikvah address this dimension.

Within this project, I critique current literature on the work of recontextualizing the mikvah ritual and suggest that *resexualization* (reclaiming the subjective joy, pride, confidence and pleasure of the sexual self) must become a more explicit component of the process.

The Fall of the Great American Evangelist: Billy Sunday and how his children influenced the decline of his ministry

JENNIFER POWELL

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In the early 20th century, Billy Sunday rose to fame as the greatest evangelist in America, speaking to millions of people through out his career. Noted for his "folksy" grammar and stunning performance on stage, Billy Sunday preached four sermons a day, six days a week, for several weeks in a row at the height of his career. And such success brought wealth and fame. As one of the most noted couples in American society, family members remained under constant scrutiny. Billy Sunday's two sons, George and William, did not follow in their father's footsteps, as he had hoped, but instead abandoned the values and morals Billy Sunday demanded from his followers.

Using primary and secondary source materials, I will demonstrate how the behavior of Billy Sunday's two sons served as the major faction in the rapid decline of his career as evangelist.

The Relationship Between Tipping and Service Quality: The Other Side of the Equation

LYNDSAY BIGLER

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DEPARTMENT OF ECONOMICS
FROST SCHOOL OF BUSINESS
CENTENARY COLLEGE OF LOUISIANA

Restaurant tipping is interesting in that gratuities are paid at the discretion of customers after they have already received the services for which they are paying. What is forgotten is that tipping involves two economic agents: the customer receiving service and paying the tip (the tipper) and the waiter or waitress performing a service and receiving the tip (the tippee). In the literature, the tipper-side of the market has been well discussed, but what appears to be lacking is an analysis of the tippee-side of the market. The intent of this paper is to use survey research to analyze the tip-recipient side of the tip market. In an initial administration of the survey it was found that if a waiter or waitress wishes to maximize his or her tip income he or she should serve high quality food to regular customers. These customers should be men consuming alcohol with their meal during the weekend. The men should be executives conducting a business discussion or they should be dining after a sporting event. The server should make sure that their food and drinks do not take too long to be delivered and he or she should always remember to smile.

Too Many Tables: The Impact of Casino Gaming & Tourism on the Restaurant Industry of Shreveport/Bossier City, Louisiana

ADAM J. DUFOUR

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For 10 years, cities across the state of Louisiana have realized the tourism, economic and societal impacts of

riverboat casino gaming. Gaming is recognized as a means of economic stimulation through job creation and tax revenues. Louisiana's tax revenue in 2001 from the casino industry alone exceeded $1.63 billion. A significant portion of this increase in tax revenue may be attributed to the industry's heavy investment in their own in-house food and beverage operations.

The purpose of this study is to determine the effects of riverboat casinos' operations and their associated tourism affects on the local economy of Shreveport/Bossier City, particularly the restaurant industry. The study will examine revenue growth of the local casino industry, changes in sales tax revenues in the local restaurant industry, and the trends of tourism growth indicators such as hotel room inventories, occupancy rates, and convention traffic.

Religion and Immorality

ELLIOTT GRAND*
& DR. HAROLD CHRISTENSEN

RESEARCH ADVISER: DR. HAROLD CHRISTENSEN
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CENTENARY COLLEGE OF LOUISIANA

Various denominations have different influences on society, especially socially destructive behavior. To observe denominational affects on negatively perceived actions, this paper focuses on four variables that account for sexual immorality and social deviance. Sexual immorality is tested by observing state divorce and annulment rates, state abortion rates, and Aids and Chlamydia rates. Social deviance is tested with the FBI crime index rate.

The four largest denominations in the U.S. are observed because of their vast presence. The four denominations tested are Catholic, Baptist, Methodist, and Lutheran. A state is classified as one of these denominations if one denomination has 20% more members than the national average. This paper shows which denominations have the most positive and negative influences on immorality within their respective states.

The Affects of Mobile Phones on Patterns of Interaction in Leisure Situations

ALEXANDER LU

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Mobile phones are rapidly becoming an integral aspect of our culture. As an information and communication technology (ICT), mobile telephony surmounts some of the technological barriers to interaction, characterizing fixed-line telephony. Mobile phones allow for the possibility of spontaneity, which is the accessibility and versatility of interaction and coordination in time and space. The ability to be spontaneous allows individuals flexibility in their interaction, which can affect how individuals perceive leisure. The ability to experience leisure in social settings is affected by size of social network, interaction frequency, and interaction salience. Mobile phones can influence these factors. The data was collected in surveys using snowball sampling. The participants included 192 persons, 91 men and 101 women. Of the respondents 150 reported owning mobile phones while the remaining 42 reported not owning a mobile phone.

Social Psychological Barriers to Equality: Effects of Race on Judgments of Socioeconomic Status

NATHANIEL LUCENA

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DEPARTMENTS OF PSYCHOLOGY AND SOCIOLOGY
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Extensive research has shown that issues of race and class are almost inseparable. The present study sought to show that race directly influenced judgments of socioeconomic status. Data collection was conducted in two stages. The first stage consisted of a survey of perceptions of requirements for membership in a social class. The second stage involved participants making judgments about an individual based on a class-charged description that was working, middle, or upper class appropriate, and a photograph of the individual that was either white or

black. Participants were asked to estimate the individual's income, education level, and socioeconomic status. The results of Stage I indicated a severely distorted estimate of middle class income by college students. The second study showed no statistically significant results, but results did show a systematic interaction between race and class when participants estimated education level and socioeconomic status.

Where Do All the Dreams Go? Aspirations, Agency, and Opportunity of Working Class Teens

STUART W. MCMAHEN

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DEPARTMENT OF SOCIOLOGY
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Research has suggested that teenagers growing up in lower class neighborhoods develop lower class aspirations that reflect their perceived lower class opportunities. My research suggests that the initial aspirations of teens do not reflect lower class opportunities, but are comparable to middle and upper class opportunities.

This paper suggests that teen aspirations undergo a process of development and diminishment that leads teens to shift their focus from long-term aspirations to short-term survival. Understanding that aspirations are not only reflections of perceived opportunities and mapping the process through which aspirations develop will provide a starting point for further research and more successful intervention and educational change.

Shaking Hands with the Devil: How Abortion Clinic Workers Cope with Stress and Stigma

JENNIFER A. POWERS

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DEPARTMENT OF SOCIOLOGY
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The workplace is a key social institution, one that influences both society and individuals in important ways. When the workplace environment is too stressful or stigmatized, employees suffer psychological and physical

health effects, and productivity declines. To understand such hazards in the workplace environment, social scientists have examined workers employed in stressful work, and those stigmatized by their work. However, little, if any, research has been done on individuals who are both stressed and stigmatized in the workplace. This research project examines abortion clinic workers faced with both stress and stigma to discover what emotion management strategies they use to cope. Data were collected through 10 months of participant observation and nine in-depth interviews with workers. To cope with stress and stigma, workers utilized three main emotion management strategies: 1) separating work from home, 2) learning to "let it go," and 3) controlling information. The importance of the strategies to understanding how to structure healthy work environment is also discussed.

Obesity and its Determinants. A Regression Analysis

ESTHER SEITZ*

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DEPARTMENT OF ECONOMICS
CENTENARY COLLEGE OF LOUISIANA

As alarming headlines and fad diets sweep the North American continent the problem of obesity escalates into a multi-million dollar business, a matter of legal concern, and a darling of the media. In fact, recent studies rank obesity and its repercussions as the second leading cause of death in the U.S. and suggest that its swelling numbers will soon surpass tobacco as the number one killer if current trends persist. Statistical data confirms that over twenty percent of the U.S. adult population is now obese as a result of the continuously rising prevalence of the epidemic over recent decades. But what exactly lies at the heart of this 21st-century phenomenon? The multivariable regression presented here attempts to assess the wide range of determinants surrounding the increasingly widespread weight problem. This cross-sectional framework evaluates the obesity problem for the entire United States on a per state basis. Independent variables employed in the regression model assess a broad spectrum of possible determinants ranging from environmental and demographic to health behavioral and dietary.

An Examination of the Possible Consolidation of African American Political Power Through Selective Migration

JOEY WALTON THOMPSON

RESEARCH ADVISERS:
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DEPARTMENT OF POLITICAL SCIENCE
CENTENARY COLLEGE OF LOUISIANA

Could African Americans enhance their political power through a movement designed to accelerate the creation of a Black majority in a targeted state or group of states? In the political arena, Blacks are proportionally under-represented in all branches and levels of government, including municipal bodies, state legislatures, and the United States Congress. In the entire history of this nation, only two Blacks have ever been elected to the powerful position of United States Senator, and only one has ever been elected as a state governor.

This thesis will examine whether accelerating this process through various means, but particularly through the migratory approach, is a viable strategy for greater political empowerment; what the likely consequences would be for the political fortunes of Blacks in America; and what effect the implementation of such a strategy might have on Black relations with the White populations of that state, the region, and the nation.

Natural Sciences

Cell Cycle Synchronization in *Arabidopsis thaliana*

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An important concept in developmental biology is that all cells in an organism contain the same DNA, yet these cells are able to differentiate into varied specializations. The plant *Arabidopsis thaliana* exhibits specialized cells called trichomes, which are leaf hairs. Much research has been conducted to study the mechanism whereby epidermal cells "decide" to become trichomes. The long-term

goal of this project is to determine if cell cycle stage influences the ability of epidermal cells to enter the trichome development pathway, while the immediate pursuit of this project was to investigate the possibility of cell cycle synchronization in *Arabidopsis*. In order to achieve synchronization, plants were treated with two different cell cycle inhibitors. After release from cell cycle blocks, mitotic cells were counted at different time points throughout a thirty-hour period. Cell cycle synchronization in *Arabidopsis* was not demonstrated; however, it was observed that inhibitor treatments did have a significant effect on the cell cycles of treated plants. The results of this project suggest that further investigation into the possibility of cell cycle synchronization in *Arabidopsis* is worth pursuing and that this research could provide important insight into the question of whether or not cell differentiation is cell cycle stage dependent.

Enhanced Sensitivity Assay for Chitinase and Chitosanase

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Chitosan, the deacetylation product of chitin, and its oligomers are subjects of increasing industrial as potential starting materials for a wide variety of products. This has generated a corresponding interest in enzymes that act on both chitin (□-1,4-*N*-acetyl-D-glucosamine) and chitosan (β-1,4-D-glucosamine). Chitinase and chitosanase activities are commonly assayed by observing changes in reducing end group concentrations as measured using 3,5-dinitrosalicylic acid, arsenomolybdate, or ferric ion-based reagents. These methods however, proved to be insufficiently sensitive for our application, so a modified procedure using disodium 2-2'-bicinchoninate (BCA) was developed. This assay was used to monitor enzyme activity in the isolation process of chitosanase.

Finding Geodesics and the Principal Curvature: A Maple Algorithm for Characterizing Surfaces

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In Euclidean geometry – the geometry taught in elementary geometry classes – the shortest distance between two points is a straight line. This simple statement is one of the first things learned in any elementary geometry book. However, it can be shown that this statement is only valid in special cases, which depend upon the surface that the points lie on. For example, on a sphere the shortest distance between two points is not a straight line, but one of the great circles going around the sphere. In general, straight lines on a surface are called geodesics of the surface, and the direction that a surface curves is called the principal curvature of a surface. Here we will explore these two concepts and how they are used to characterize a surface. We present a Maple algorithm that finds the principal curvature and geodesics on the surface.

Electrodeposition of Ruthenium onto Copper Barrier Layers with Iodine Coverage

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With the rise of smaller more powerful microchips, the need for improvements arises. From the Cu (Copper) problem, which has been solved by diffusion barrier layers, the need to create an efficient process has emerged. A process that combines the chemisorption of I (Iodine) on the surface of Ru (Ruthenium), and then the electrodeposition of Cu onto the Ru was used. Analysis using XPS and AES shows that the layers were as follows: Ru on bottom, Cu next, and I on top.

Endothelial Cells, Cytokines, MMPs and Their Relationship in Chronic Inflammation

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One of the main hallmarks of chronic inflammation is increased permeability through inter-endothelial tight junctions. The presence of cytokines in inflammation activates matrix metalloproteases (MMPs) which disintegrate tight junction proteins that govern barrier function, such as occludin, claudin-5, and vascular endothelial cadherin (VE-cad). To examine the role of MMP inhibitors in tight junction barrier regulation, human umbilical vein endothelial cells (HUVEC) and Immortomouse Endothelial Cells (I-colon) were treated with GM6001, a hydroxamate MMP inhibitor, prior to exposure to the inflammatory cytokines tumor necrosis factor-a (TNF-a) interleukin-1b (IL-1b), and interferon-g (INF-g). Endothelial barrier integrity in-vitro was measured by transmonolayer electrical resistance while structural organization of junctional complexes was examined by Immunofluorescence microscopy. Proteolysis of occludin (70-85kD), VE-cadherin (140kD) and claudin-5 (40kD) was observed by western blotting, and zymograms for MMP-2 and MMP-9 in HUVEC showed the activation of these two enzymes that correlated with the proteolysis of occludin and VE-cadherin. The data suggests that the cytokines activate MMP, which alter the stability of tight junction proteins. However, when cells are pre-treated with GM6001, some tight junction proteins are greatly protected from this destabilization and increased permeability and may represent an important new target for therapy in many forms of chronic inflammation.

St. John's Wort and Environmental Enrichment: Effects on Stress, Spatial Memory, and Hippocampal Thickness

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Environmental enrichment and treatment with antidepressants have many of the same behavioral and molecular effects (improved spatial memory, less anxiety, increased neurogenesis in the hippocampus). Can enrichment be used as a treatment for depression, and can antidepressants cause the effects of environmental enrichment? Sixteen mice were divided into four treatment groups: controls, enriched, high concentration of SSRI (St. Johns Wort) and low concentration of SSRI. After 28 days in these conditions, mice were run through the Morris Water Maze and NSF test (test of anxiety and stress). SJW mice had improved spatial memory, and anxiety levels of controls were the highest. The hippocamppi, were then analyzed. Enriched mice had the largest brain to body weight ratio, and controls the smallest ratio ($p<0.01$). SJW and enriched mice both had thicker hippocamppi (measured vertically) and thicker dentate gyrus and SGZ (layer within the dentate) as compared to control mice ($p<0.05$). Two different areas of dentate gyrus were measured, and results from both were very similiar. Therefore, these results show that the differences seen are not just in one area of the dentate gyrus. This study shows that at least in a superficial sense, environmental enrichment and SJW can cause the same behavioral and brain effects. Further studies are needed to see if the increased dentate thickness is due to birth of new neurons or glial cells.

Detection of NO_2 through use of Fluorescence Spectroscopy

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The pathways of Nitric Oxide are very complex and include mediating physiological responses such as blood perfusion, synaptic nerve transmission, and immunologi-

cal responses. NO also has been known to have a role as a regulator of cellular redox status and consequently as a regulator of gene expression. Despite the important roles of NO in the body, relatively little is known about its relationship with metabolic pathways in vivo because there is considerable difficulty in assessment methods. Current methods in use focus on radio-labeled NO precursors or NO-donors, however these are highly unstable and therefore yield relatively small signals. Newer methods involve using 15N-labeled precursors which produce the stable and non-radioactive isotope 15NO. Our project focuses on detection of the NO oxidation product, Nitrogen Dioxide (NO2). This product is then quantified by means of fluorescence.

Through use of a tunable dye laser, we aim to excite molecules of NO2 with light of 440 nm and measure its fluorescence intensity over a range of wavelengths using a photomultiplier tube. Through repeated experiments, we have worked to hone our detector to be sensitive to small concentrations of NO2 in preparation for work with 15NO2.

Metabolic Differences of Male Green Anoles (*Anolis carolinensis*) in Enriched and Impoverished Habitats

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Anolis carolinensis (green anoles) is a species of lizard that has the ability to change body color depending on emotional state. Largely contrasting environments may negatively affect their emotional state and metabolic rate has been shown to be tied to emotional state in many animals. I hypothesized that impoverished environments would stress the anoles causing an increase in their metabolic rate. Six male anoles were separated into groups with two placed in a natural environment, consisting of green leaves, peat moss, and wooden perches, two in an artificial environment, consisting of metallic foliage and fluorescent ground cover, and two in an empty impoverished environment. Carbon dioxide production was measured to test metabolic rate. No significant changes in metabolism were detected when placed in enriched or impoverished environments. The data showed that the

average CO2 production was greatest in the enriched environment, followed by the artificial environment. The data also showed that the amount of light available in each environment was inversely proportional to the metabolic rate. Increased shade in the enriched environments could have caused increase stress as well, increasing the metabolism of the anoles.

Fire safety: Analysis of aerosols from smoldering electronics components and insulation materials

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Smoldering electronics and insulation materials can produce aerosols, which pose serious hazards to spacecraft personnel. Our goal was to develop a method for sampling and analyzing the evolved aerosols with a view toward developing fire signatures that would aid in their early detection or guide the selection of materials on spacecraft. We generated a smoldering combustion using gradual overvoltage for electronic components and an electrically heated canthol wire for insulation materials. Aerosols were drawn through a filter attached to an enclosed combustion chamber using a vacuum line. The material collected was weighed and analyzed by ICP-AES and TEM. The aerosols did show wide variation in chemical composition dependent on the composition of the original electronic component. Aerosols from two of the capacitors tested showed levels of lead and cadmium, respectively, in excess of 1000 ppm. Microscopy revealed no significant differences in the size and morphology of the evolved particles.

Periodization of Weight Training

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Traditional periodization of weight training is a weight-lifting program where the intensity of weight increases and the volume decreases. The purpose of the study was to examine the effects of periodization of weight training in college-age females. Periodization, control, and single-set groups trained for a 10-week period to determine which group would reach optimal muscle strength and a greater change in body fat percentage. Results from this study showed that the periodization group had the best results in lowering body fat percent and an increase in strength in the subjects.

Effect of environment on the CO_2 output of *Bufo woodhousii* when exposed to a simulated predator

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Bufo woodhousii are small toads found in the mid-western United States, including the campus of Centenary College. I examined the metabolic response (CO_2 production) of these toads to a simulated predator using the Flying Windows screensaver of Microsoft Windows in both an enriched environment and impoverished environment. The enriched environment offered a place for the toad to hide while the impoverished environment did not offer a place to hide or burrow. I found that the toads exposed to a predator had a higher variance in their metabolic response to the "predator" than the toads exposed to a blank screen. Behaviorally, the two responses seen were either crouching and freezing in place or jumping against the sides of the clear test chambers. This indicates that the toads demonstrate individual responses to stress instead of a species-specific instinctual response.

A Comparative Analysis of T-Lymphocytes in Healthy and Inflamed Mice Colons

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The purpose of this study is to quantify and compare the number and types of mouse T-lymphocytes (a special category of white blood cells) in the small intestine and in a normal and inflamed large bowel. Fresh tissue was harvested from the small intestine and the distal portion of the colon for both wild type (normal) and colitic (inflamed) mice. By using high-powered epifluorescent microscopy and the program Metamorph integrated morphometry we were then able to quantify and calculate the number and types of T-lymphocytes per mm2 in the healthy and colitic wild type colons.

Based on our data, it was found that the small intestine housed more T-cells than the colon. Also, it was found that an inflamed colon had a significant increase in the number of T-cells as compared to the wild-type colon. From the data, it was concluded that a category of T-lymphocytes called CD4+ cells invade and proliferate within the inflamed colonic interstitium. These data suggest that these cells may initiate much of the tissue inflammation and injury of inflammatory bowel diseases.

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